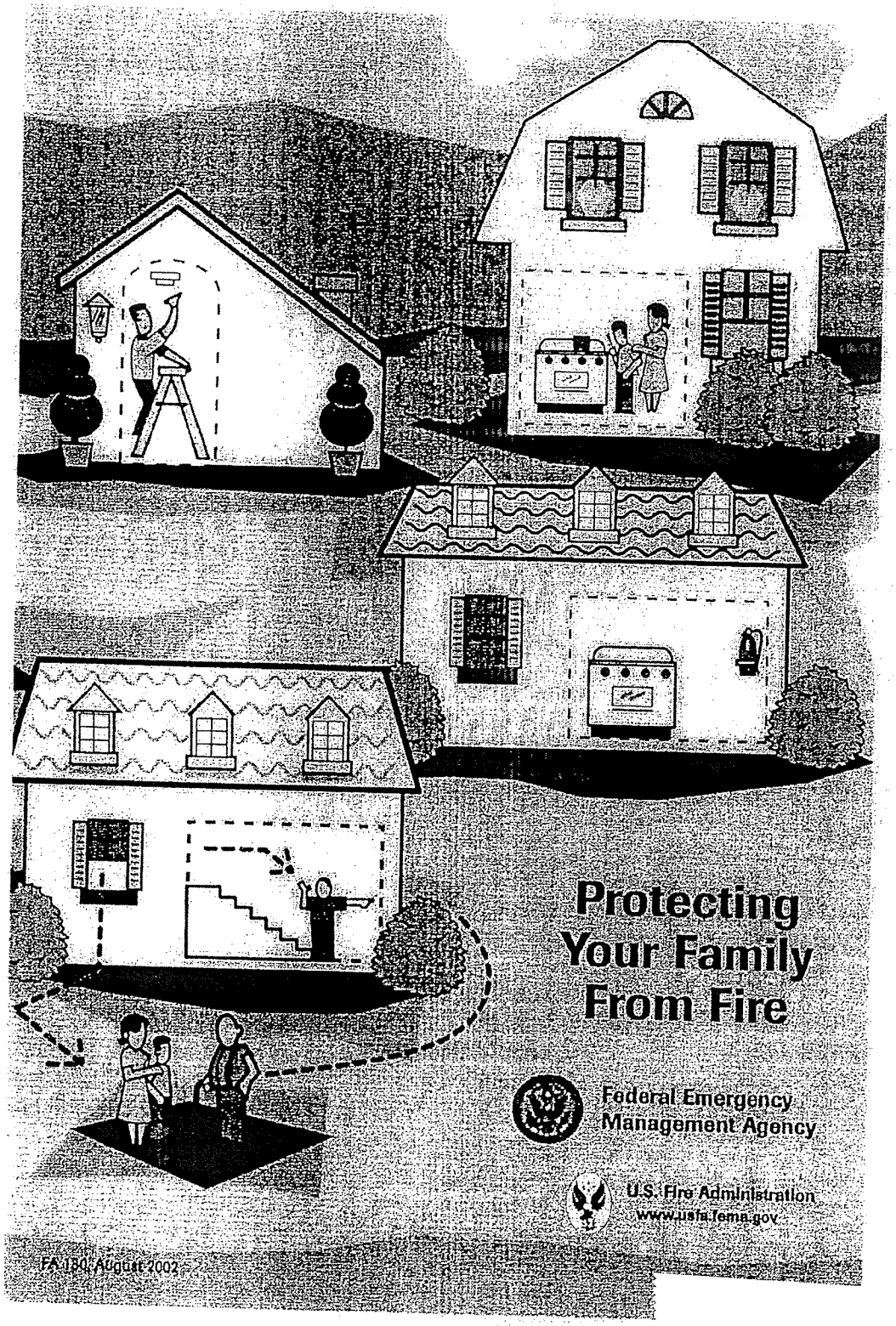
EXECUTIVE OFFICE OF PUBLIC SAFETY AND SECURITY
OCTOBER 11, 2007 MEETING OF BOARD OF FIRE
PREVENTION AND BOARD OF BUILDING
REGULATIONS AND STANDARDS

INDEX FOR COLLECTION OF QUOTES & STUDIES
RE: SMOKE ALARM TECHNOLOGY

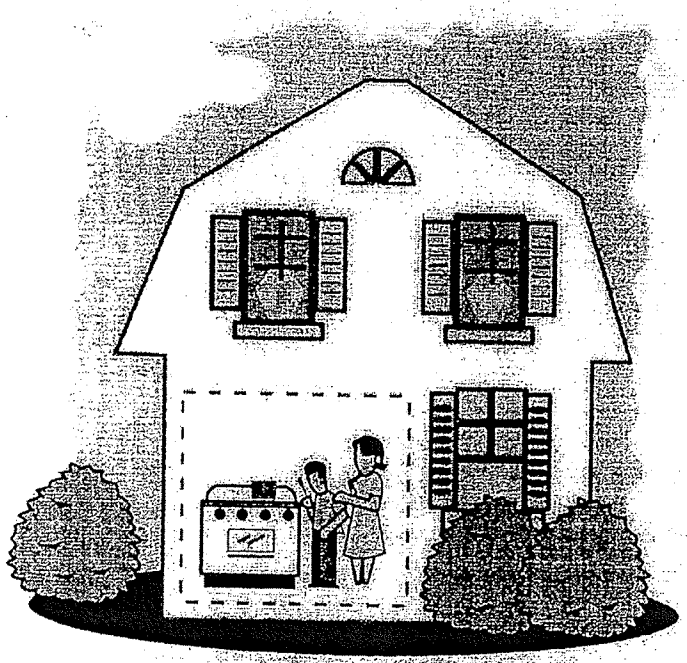

Protecting
Your Family
From Fire
Federal Emergency
Management Agency
U.S. Fire Administration
www.usfa.fema.gov
FA-130, August 2002

Fire and Older Adults

The risk of death from fire for Americans age 65 and over is two times greater than the risk for adults under 65, and hospital stays of more than 40 days are common for older burn victims. Thus, older people need to be especially careful with fire. People can become victims of fire by falling asleep smoking, either in bed or in a favorite chair, especially after consuming alcohol or taking medication. Ashtrays emptied before smoldering materials are completely out also start a number of fires in homes of smokers. Cooking is a major cause of fire injuries among older persons when loose-fitting clothing is ignited as the wearer reaches over a hot burner, or slips and falls onto the stove.

Smoke Alarms

One of the most important fire safety devices for the home is the smoke alarm. After becoming generally available in the early 1970's home smoke alarm sales grew rapidly and the price fell, so that by 1991, 88% of US homes had at least one, and alarms could be purchased for under $10.



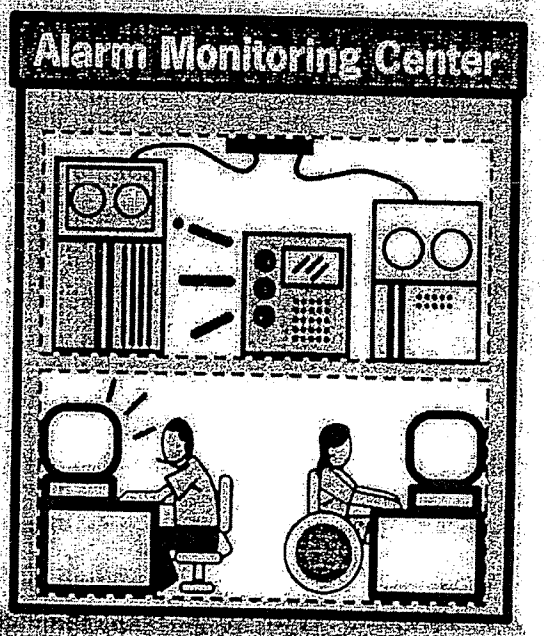
Several studies have concluded that when working smoke alarms are present, the chance of dying from the fire is cut in half. The smoke alarms currently in place have saved thousands of lives, but several problems exist. First, the 12% of homes without alarms have more than half of the fires; second, it is estimated that a third of the smoke alarms in place are not working, often due to failure to replace a worn out battery; and third, many homes do not have as many smoke alarms as are needed to protect the occupants properly. In this chapter, we will examine how to protect your family with smoke alarms.

How Many Alarms are Needed?

The primary job of our smoke alarm is to protect you from fires while you are asleep. Thus, your alarms should be located between any sleeping persons and the rest of the house – outside bedrooms or sleeping areas. But tests conducted in the 1970's clearly showed that this might not be enough.

In multi-story homes, fires on a floor level without a smoke alarm can grow to dangerous conditions before sufficient smoke can rise in a stairway to set off an alarm on the upper floor. Based on this observation, most codes require that additional smoke alarms be located on each floor level of the home.

A closed door provides protection from smoke on the other side, but will also prevent smoke from reaching a smoke alarm. This is particularly a problem in bedrooms. If you sleep with your bedroom door closed, you should add a smoke alarm in the bedroom; particularly if you smoke in the bedroom or there is a TV, air conditioner, or other major appliances in the bedroom that might start a fire. If you sleep with the bedroom door open, the alarm in the hall outside will detect a fire in the bedroom or elsewhere.



There are a few places where a smoke alarm should not be placed. These include kitchens and garages (cooking fumes and car exhaust are likely to set them off) and unheated attics and crawl spaces (where it can get too cold or hot

for the electronics to work properly). Fires beginning in these areas are generally detected by the other smoke alarms in enough time to escape safely. If an alarm is desired in these spaces, heat detectors are available. But remember that the smoke alarms are the primary safety devices in any home protection scheme.

What Kind of Smoke Alarm Should You Get?

There are two types of home smoke alarms available, the ion type and the photoelectric type. The ion type reacts faster to open flaming fires and is usually the least expensive. The photoelectric type reacts faster to smoldering fires and is less likely to react to cooking. Both types provide good protection and can be used without worry. If you need more than one alarm, you might get one of each. There are also multiple ways to power smoke alarms. Most operate on a battery (usually 9 volt), which should be replaced at least once a year. When the battery needs changing, the smoke alarm will begin to "chirp" every 20 seconds or so, this will persist for a month. This is most likely to start in the middle of the night (when the temperature in the house drops) causing you to get up and remove the battery so you can sleep. To prevent this nuisance you should pick a special day and give your alarms new batteries once a year. Some fire safety organizations promote "change your clocks, change your batteries" when the change is made back from daylight savings time each fall. Always make sure that you use the right battery—the required battery type is marked on the alarm near where the battery goes. Smoke alarms installed in a house may be operated from the household electrical power and not need battery replacement. This type of alarm has a "power on" light to tell you that the alarm has power. Smoke alarms are available which run on house power but also have a battery in case the main power fails. Both types of alarms need to be tested monthly and batteries should be replaced yearly just as with the battery-only operated type.

Underwriters Laboratories Inc.

Product Safety Tips:

Smoke Alarms

Few of us realize how easily -- and how quickly -- fire can destroy our homes and take the lives of those we love. Fortunately, a product is available that can help protect us against fire... the smoke alarm.

By providing an early warning in the event of fire, smoke alarms may allow you and your family sufficient time to reach safety. Many people have neglected to install smoke alarms despite their life-saving potential and low cost. Even those who do have smoke alarms often take them for granted -- forgetting that they need some attention to continue working properly. Underwriters Laboratories Inc. (UL) offers the following tips for purchasing and maintaining smoke alarms.

Cut your family's risk in half - buy smoke alarms today

Experts report that consumers may cut their risk of dying in a home fire in half simply by having a smoke alarm in their homes. Smoke alarms are available at nearly all hardware, department and discount stores, often for under $20.

Look for the UL Mark

When you purchase a smoke alarm, look for the UL Mark on the product as well as on the packaging. The UL Mark tells you that a representative sample of the smoke alarm has been evaluated by Underwriters Laboratories Inc. (UL) to nationally recognized safety requirements. It also means that UL conducts follow-up evaluations to countercheck that samples of the smoke alarm continue to meet these safety requirements.

Photoelectric and Ionization type alarms

There are two types of smoke alarms available today: photoelectric and ionization. When smoke enters a photoelectric alarm, light from a pulsating light source in reflected off the smoke particles onto a light sensor, triggering the alarm. When smoke enters an ionization alarm, ionized air molecules attach to the smoke particles and reduce the ionizing current, triggering the alarm. While photoelectric smoke alarms generally respond faster to smoldering smoke conditions and ionization smoke alarms generally respond faster to flaming fire conditions, both types provide adequate protection against fire. Combination smoke alarms featuring both photoelectric and ionization technology are also available at hardware, department and home improvement stores.

There's safety in numbers

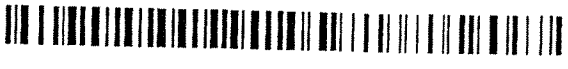
Install at least one smoke alarm on each floor of the house or residence and outside all sleeping areas. Some fire safety advocates recommend installing smoke alarms inside each sleeping area if sleeping with the door closed.

Test, clean and maintain your smoke alarms

Working smoke alarms are needed in every home and residence. Test and maintain your smoke alarms at least once a month, or follow the manufacturer's instructions. Smoke alarms most often fail because of missing, dead or disconnected batteries. Replace batteries at least once a year.

Practice a fire escape plan

In addition to installing smoke alarms in your home, the safety experts at UL also recommend that you develop a fire escape plan and practice it at least twice a year with all members of your household. In the event of a fire, every family member should know at least two



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Smoke alarms

Make them work for your safety

- Smoke alarm facts
- Installation and maintenance tips
- A life-saving test: check your smoke alarms regularly

Smoke alarms are the residential fire safety success story of the past quarter century. Smoke alarm technology has been around since the 1960s. But the single-station, battery-powered smoke alarm we know today became available to consumers in the 1970s, and since then, the home fire death rate has been reduced by half. Most states have laws requiring them in residential dwellings.

Important: Working smoke alarms are essential in every household. It is necessary to practice home fire drills to be certain everyone is familiar with the smoke alarm signal, and to determine if there are any obstacles to a quick and safe evacuation (including the inability for some to awaken to the smoke alarm signal).

Facts & figures

- A 2004 U.S. telephone survey found that 96% of the households surveyed had at least one smoke alarm.
- Roughly half of home fire deaths result from fires in the small percentage of homes with no smoke alarms.
- Homes with smoke alarms (whether or not they are operational) typically have a death rate that is 40-50% less than the rate for

Smoke alarm installation guide

NFPA's free smoke alarm installation guide (PDF, 1.3 MB) is a comprehensive resource for fire safety advocates – firefighters, safety educators, business leaders and representatives of older adult or health groups.

Download a PowerPoint presentation (right-click and save to desktop) to help train volunteers about your alarm installation project.

Also see

NFPA's "U.S. Experience with Smoke Alarms and Other Fire Detection/Alarm Equipment" report.
Members: Download this report for free. (PDF, 301 KB)
All visitors: Order this report.

homes without alarms.

- In one-quarter of the reported fires in homes equipped with smoke alarms, the devices did not work. Households with non-working smoke alarms now outnumber those with no smoke alarms.
- Why do smoke alarms fail? Most often because of missing, disconnected or dead batteries.

Source: NFPA's "U.S. Experience with Smoke Alarms and Other Fire Detection/Alarm Equipment."

Installation and maintenance tips

- Install smoke alarms on every level of your home, including the basement, making sure that there is an alarm outside every separate sleeping area. New homes are required to have a smoke alarm in every sleeping room and all smoke alarms must be interconnected.
- Hard-wired smoke alarms operate on your household electrical current. They can be interconnected so that every alarm sounds regardless of the fire's location. This is an advantage in early warning, because it gives occupants extra time to escape if they are in one part of the home and a fire breaks out in another part. Alarms that are hard-wired should have battery backups in case of a power outage, and should be installed by a qualified electrician.
- If you sleep with bedroom doors closed, have a qualified electrician install interconnected smoke alarms in each room so that when one alarm sounds, they all sound.
- If you, or someone in your home is deaf or hard of hearing, consider installing an alarm that combines flashing lights, vibration and/or sound.
- Mount smoke alarms high on walls or ceilings (remember, smoke rises). Ceiling mounted alarms should be installed at least four inches away from the nearest wall; wall-mounted alarms should be installed four to 12 inches away from the ceiling.
- If you have ceilings that are pitched, install the alarm near the ceiling's highest point.
- Don't install smoke alarms near windows, doors, or ducts where drafts might interfere with their operation.
- Never paint smoke alarms. Paint, stickers, or other decorations could keep the alarms from working.

FEATURED PRODUCT

NFPA 72: National Fire Alarm Code, 2002 edition
If you're involved in the design, installation, maintenance, testing, or use of fire alarm systems, you need the *National Fire Alarm Code®!*

Item #: 7202
List: $50.00
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Book

The Smoke Alarm Show

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EXHIBIT047.002

A life-saving test: check your smoke alarms regularly

- Test your smoke alarms once a month, following the manufacturer's instructions.
- Replace the batteries in your smoke alarm once a year, or as soon as the alarm "chirps" warning that the battery is low. Hint: schedule battery replacements for the same day you change your clocks from daylight savings time to standard time in the fall.
- Never "borrow" a battery from a smoke alarm. Smoke alarms can't warn you of fire if their batteries are missing or have been disconnected.
- Don't disable smoke alarms even temporarily. If your smoke alarm is sounding "nuisance alarms," try relocating it farther from kitchens or bathrooms, where cooking fumes and steam can cause the alarm to sound.
- Regularly vacuuming or dusting your smoke alarms, following the manufacturer's instructions, can keep them working properly.
- Smoke alarms don't last forever. Replace yours once every 10 years. If you can't remember how old the alarm is, then it's probably time for a new one.
- Consider installing smoke alarms with "long-life" (10-year) batteries.
- Plan regular fire drills to ensure that everyone knows exactly what to do when the smoke alarm sounds. Hold a drill at night to make sure that sleeping family members awaken at the sound of the alarm. Some studies have shown that some children may not awaken to the sound of the smoke alarm. Know what your child will do before a fire occurs.
- If you are building a new home or remodeling your existing home, consider installing an automatic home fire sprinkler system. Sprinklers and smoke alarms together cut your risk of dying in a home fire 82 percent relative to having neither – a savings of thousands of lives a year.

Sensing systems
Most smoke alarms use one of two common sensing systems for detecting a fire.

- Ionization-type smoke alarms have a small amount of radioactive material between two electrically charged plates, which ionizes the air and causes current to flow between the plates. When smoke

DVD/VHS (Grades 3-6)
Deliver essential smoke alarm facts with this imaginative video "ed-venture" for all ages!

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enters the chamber, it disrupts the flow of ions, thus reducing the flow of current and activating the alarm.

- Photoelectric-type alarms aim a light source into a sensing chamber at an angle away from the sensor. Smoke enters the chamber, reflecting light onto the light sensor, triggering the alarm.

Ionization vs. photoelectric
Photoelectric alarms respond slightly faster to smoldering fires; ionization alarms respond slightly faster to flaming fires. Since, as a practical matter, you can not predict the type of fire that will occur; the slight difference is irrelevant. Either type of alarm will detect nearly every type of fire quickly. Some manufacturers offer dual-chamber alarms that use both sensor systems.

NFPA does not test, label or approve any products.
Updated: 11/05

› **NFPA's position on smoke alarms**

› **NFPA urges replacing home smoke alarms after 10 years**

› **Detectores de Humo**

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NFPA Mission: Reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. More about NFPA.

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URL: http://www.nfpa.org/categoryList.asp?categoryID=278&URL=Research%20&%20Reports/Safety%20fact%20sheets/Fire%20protection%20equipment/Smoke%20alarms

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EXHIBIT047.004

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EXHIBIT043.001

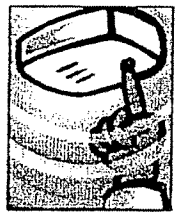
Choosing Your Alarm

The majority of fatal home fires happen at night when people are asleep. Smoke alarms give you time to escape.

- Be sure the smoke alarm you buy bears the label of an independent testing lab.
- Some alarms run on household current and include battery backup, which require professional installation.
- Some alarms run just on batteries which you can usually install yourself.
- Some alarms have "ten - year" lithium batteries that are intended to last the life of the smoke alarm.
- Some alarms use an "ionization" type smoke-sensing system; others use "photoelectric" sensors. Both types offer adequate protection.
- Some alarms have "hush" buttons so you can deactivate them if cooking fumes or steam set off a "nuisance alarm." These models re-activate automatically after 5 to 10 minutes.
- For the hearing-impaired, some alarms flash a strobe-like light.

Maintaining your alarms

- Always save and follow the manufacturer's instructions for testing and maintenance.



- Test alarms monthly.
- Replace batteries at least once a year — for example, when you set the clocks back in the fall — or whenever an alarm "chirps" to tell you the battery is low.

Never "borrow" a smoke alarm battery.

- Replace any smoke alarm that is more than 10 years old.
- Clean your alarms regularly, following manufacturer's instructions. You can sometimes use a vacuum cleaner without removing the detector's cover.
- Never paint a smoke alarm.

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www.nfpa.org
www.sparky.org

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Home Smoke Alarms

It's a fact: Smoke alarms save lives

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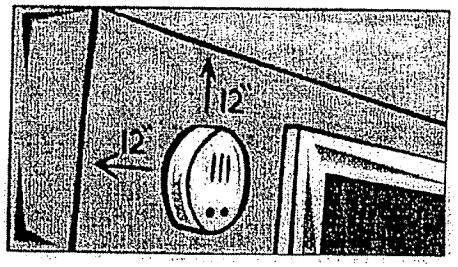
Placing your alarms

- Install alarms on every floor of your home — including the basement.

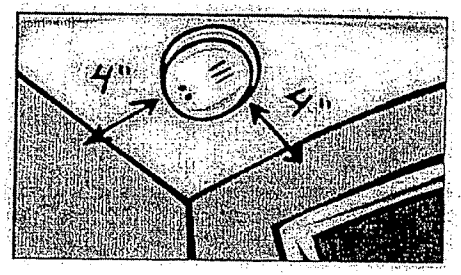


- Install an alarm outside each sleeping area — inside as well if people sleep with their doors closed or if otherwise required by codes or local authorities. (NFPA 72, *National Fire Alarm Code®*, requires builders to install interconnected smoke alarms inside each sleeping room in new construction).
- On floors without bedrooms, install alarms in the living room and/or near the stairways to the upper level.
- NFPA also suggests you install alarms in dining rooms, family rooms, utility rooms, hallways, and other living areas.

Be sure everyone sleeping in your home can hear your smoke alarms.

- Don't install alarms closer than 3 feet from a kitchen or bathroom door.
- Don't install alarms in locations where the temperature may be too low or too high.
- Mount alarms high on a wall or on the ceiling, because smoke rises.

Wall mounting: Position the top of the alarm 4 to 12 inches from the ceiling.

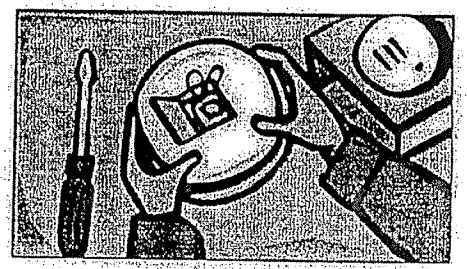


Ceiling mounting: Position alarms at least 4 inches away from the nearest wall.

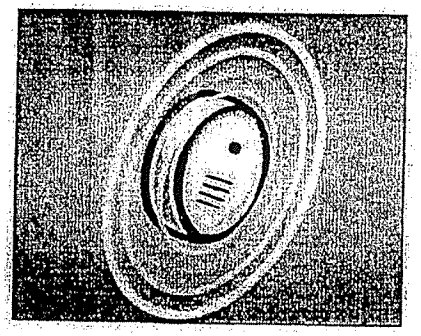
- In a room with a pitched ceiling, mount the alarm at or near the ceiling's highest point.
- Basement alarms should be located near the stairway leading to the floor above.
- Don't mount an alarm within 3 feet of a forced-air supply register.

Installing your alarms

- Follow the manufacturer's instructions.
- Install most battery-powered and plug-in alarms using only a drill and a screwdriver. Plug-in alarms must have restraining devices at the plug.



- Have a qualified electrician install alarms that are hard-wired into your house wiring.
- Never connect an alarm to a circuit that can be turned off from a wall switch.
- Wire alarms together so that if one sounds, they all sound.



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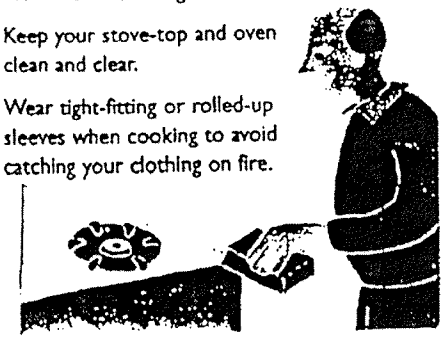
Kitchen

Stove burners and ovens can burn you and start fires. Be attentive and remember these safety tips.

- ✓ Never leave cooking unattended.
- ✓ Keep your stove-top and oven clean and clear.
- ✓ Wear tight-fitting or rolled-up sleeves when cooking to avoid catching your clothing on fire.



- ✓ Keep combustible materials away from the stove. Don't hang curtains, potholders, or towels near burners or the oven.
- ✓ Turn pot handles inward so they can't be bumped or pulled over.
- ✓ Never allow children or pets to play in the area where you are cooking.
- ✓ If a small fire starts in a pan, carefully slide a lid over the pan to smother the flames, and turn off the burner. Keep lid on until pan is cool.
- ✓ Never pour water on a grease fire.
- ✓ In microwave ovens, use only those containers designed for microwave use.

Workshops, storage areas, and outdoors

You may have flammable materials in your basement or garage. Exercise fire safety inside and out.

- ✓ If you store gasoline, keep it outside your home in a shed or detached garage. Keep only small quantities in tightly sealed containers. Use gasoline only as a motor fuel, never as a cleaning agent.
- ✓ Always store paint and other flammable liquids in their original, labeled containers with tight-fitting lids. Use and store flammable liquids far away from appliances, heaters, pilot lights, and other sources of heat or flame. Never smoke near flammable liquids.
- ✓ Have your furnace checked by a professional once a year.
- ✓ Remove trash from your home. Don't store anything near a furnace or heater.
- ✓ Use outdoor cooking grills with caution. Never use gasoline to start the fire, and don't add charcoal lighter once the fire has started. You can use dry kindling to revive the flame.
- ✓ Use cooking grills outside only, not on porches or balconies, and away from vegetation and combustibles.
- ✓ Before starting your lawnmower, snowblower, or motorcycle, move it away from gasoline fumes. Let small motors cool before you refuel them.
- ✓ Never store propane cylinders indoors.

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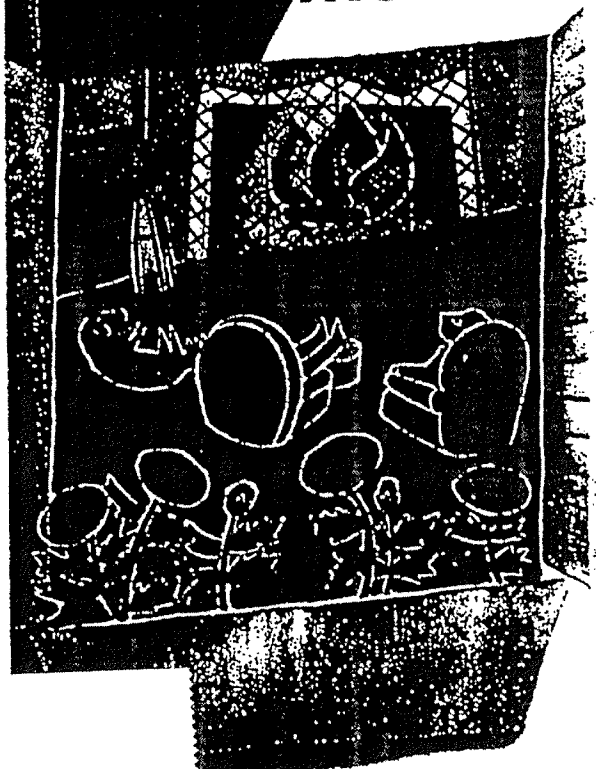

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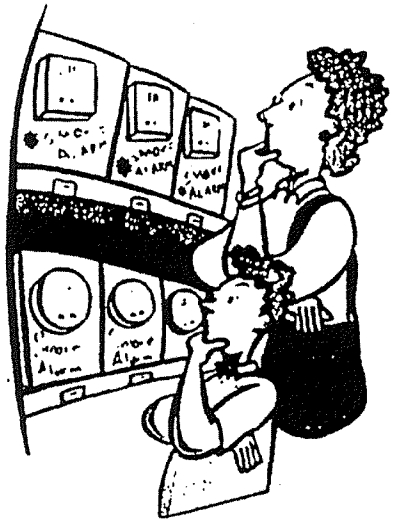
Smoke Alarms Save Lives

The majority of home fires that kill people happen at night. If you're asleep, the smell of smoke won't always wake you up. In fact, smoke and poisonous gases can put you into a deeper sleep.

Inexpensive home smoke alarms can wake you in time to escape — cutting your chances of dying nearly in half. Smoke alarms do save lives, and, in most states, are required by law in private homes.



How to Choose an Alarm

Be sure that the smoke alarm you buy carries the label of an independent testing lab.

Some home smoke alarms run on batteries, others on household current. There are also different sensor technologies, some faster to react when fires are smoldering, others faster when fires are openly flaming, all are fast enough to provide sufficient warning. All laboratory tested smoke alarms, regardless of type, will protect you if they're installed and maintained properly.

How Many Do You Need?

Install at least one smoke alarm on every floor of your home, including the basement, and outside each sleeping area. Smoke alarms should also be installed in sleeping rooms if you sleep with the doors closed. New homes require smoke alarms in each sleeping room. On floors without bedrooms, install alarms in or near dens, living rooms, family rooms, and other living areas.

Be sure everyone sleeping in your home can hear your smoke alarms. If someone in your home is hearing-impaired, you can install alarms that flash a strobe light as well as sound an alarm. Some even use a different alarm-pitch that is easier for partially deaf people to hear.

The *National Fire Alarm Code* does not recommend installing alarms in kitchens, bathrooms, or garages -- where cooking fumes, steam, or exhaust might set off false alarms -- or in attics or other unheated spaces.

Where to Install

Smoke rises, so mount alarms high on a wall or on the ceiling. Position wall-mounted alarms with the top of the alarm 4 to 12 inches (10 to 30 centimeters) from the ceiling. Position ceiling-mounted alarms at least 4 inches (10 centimeters) away from the nearest wall. In a room with a pitched ceiling, mount the alarm at or near the ceiling's highest point.

In stairways with no doors at the top or bottom, install alarms anywhere along the path smoke would take as it traveled up the stairs. But always position smoke alarms

at the bottom of closed stairways, such as those leading from the basement. Dead air trapped near the door at the top of a stairway could prevent smoke from reaching an alarm located at the top.

Don't install a smoke alarm near a window, door, or forced-air register where drafts could interfere with its operation.

Installation

Most battery-powered smoke alarms and alarms that plug into wall outlets can be installed using only a drill and a screwdriver, by following the manufacturer's instructions. Plug-in alarms must have restraining devices so they can't be unplugged by mistake.

You can also hard wire alarms into your home's electrical system. *Have a qualified electrician do the job.* Never connect a smoke alarm to a circuit that can be turned off from a wall switch.

FIRE & LIFE SAFETY SECTION
OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS
4025 FAIR RIDGE DRIVE • FAIRFAX, VA 22033-2868 • TEL: 703/273-0911 • www.iafc.org

Position Paper

Smoke Alarms – Ionization and Photoelectric Technology

Summary - The Fire and Life Safety Section (FLSS) of the International Association of Fire Chiefs (IAFC) is providing this summary of current information regarding the use of ionization and photoelectric smoke alarms for its members to use in their public education programs. The goal is to explain the different response characteristics of these two types of smoke alarms and offer advice relating to what to tell the public about smoke alarm use. It is important to note that smoke alarms are only one component of a comprehensive residential fire protection plan that also includes the installation of residential fire sprinklers and fire escape planning. For the best protection, all smoke alarms should be interconnected throughout the home.

In April 2007, Underwriters Laboratories (UL) and the NFPA Fire Protection Research Foundation (FPRF) published a report of the UL Smoke Characterization Project which stated that residential smoke alarms provide a critically important notification to occupants that there is a presence of smoke and/or fire.

The study by UL reported that fires in either a flaming or a smoldering phase provide several cues for smoke alarms, including:

- smoke particulates
- heat
- gasses such as carbon monoxide, also known as CO.

The study explained that current smoke alarms use two types of smoke sensing technologies: photoelectric or ionization. The photoelectric type has a light source and detects the scattering or obscuration caused by smoke particulates. The ionization type detects changes in local ionization field within the detection chamber resulting from the presence of smoke. Both types of alarms activate when a set threshold is reached.

A copy of UL's study may be found at:
http://www.nfpa.org/assets/files/PDF/Research/SmokeCharacterization.pdf.

The UL Smoke Characterization Project followed a 2004 study conducted by the National Institute of Standards and Technology (NIST) that indicated fires in today's homes smolder longer and then burn hotter and faster than what was typical when smoke alarms were first introduced a number of years ago. The NIST study also concluded that because fires could be more aggressive, the time needed to escape some types of fires has been

reduced significantly from approximately seventeen (17) minutes, at the time of the original study in the 1970s, to as little as three (3) minutes under certain conditions today. While current technology smoke alarms were found in the NIST study to operate within the established performance criteria, there was a difference in activation times for the different sensing technologies (photoelectric or ionization) depending upon the type of fire development (fast-flaming fires verses smoldering fires).

The link to published work on the NIST website is: http://smokealarm.nist.gov/

Early detection and notification of fires is critical to escape time, because the time to arrive at untenable conditions in residences can be as little as three minutes for typical flaming fire scenarios. Both ionization and photoelectric smoke alarm technologies quickly alert occupants in most fire scenarios.

In the controlled experiments conducted by NIST, ionization alarms react earlier than photoelectric alarms in fast-flaming fires, such as those involving paper or flammable liquids, while photoelectric alarms tend to react substantially earlier than ionization alarms in smoldering fires, such as those ignited by cigarettes in upholstered furniture, bedding materials, and mattresses.

While it is generally recognized that each sensing technology may be better in particular applications, it is impossible to predict what type of fire will occur in a typical residence. Therefore, fire safety experts recommend that a home have a combination of both ionization and photoelectric smoke alarms or dual sensor smoke alarms that incorporate both type of sensing technologies in one unit to ensure the fastest response to both flaming and smoldering fires. It is vitally important to note that smoke alarms are only effective when they work. Smoke alarms should never be disabled, and must be tested, cleaned, maintained and replaced according to manufacturers' instructions.

The IAFC, through its Fire & Life Safety Section (FLSS), recommends that IAFC members include the following information when they educate the public about the use of smoke alarms:

• There are two main types of technologies used in smoke alarms to detect smoke. Both technologies detect all types of growing fires. Ionization alarms, which sell for about $5 for battery-operated models, respond faster to flaming fires, such as those involving paper or flammable liquids. Photoelectric alarms, which sell for about $20, respond faster to smoldering fires, such as those ignited by cigarettes in upholstered furniture, bedding materials, and mattresses. Dual sensor smoke alarms use both ionization and photoelectric sensors and cost about $30.

• Smoke alarms that use either type of sensing technology have been proven to save lives, prevent injuries, and minimize property damage by detecting and alerting residents to fires early in their development, and that the risk of dying from fires in a home without smoke alarms is twice as high as in homes that have working smoke alarms.

- Since it cannot be predicted what type of fire will start in a home, it is important that both smoldering and flaming fires are detected as quickly

as possible. The best protection is to have both types of smoke alarms installed, or install dual sensing technology smoke alarms that incorporate both ionization/photoelectric sensors.

- Working smoke alarms should be installed on every level of the home, outside sleeping areas and inside bedrooms, as per manufacturer's specifications. Furthermore, smoke alarms can only offer protection if they are working, and as such, they should be tested, and maintained in accordance with the manufacturer's specifications.

- If smoke alarms are battery operated or have battery back-up, the batteries should be replaced at least once a year during the IAFC's "Change your clock, change your battery" program in October. In addition, experts say that the entire smoke alarm itself should be replaced every 10 years.

- Batteries should never be removed to disable a smoke alarm, even if you experience "nuisance" alarms, such as while cooking or showering. Simply fan the detector with a newspaper or towel to stop the alarm. Clean the smoke alarm according to the manufacturer's instructions, and consider relocating it away from the kitchen or bathroom. Some smoke alarms have a silencing or "hush" feature, so nuisance alarms can be stopped quickly and easily. Other smoke alarms use a long-life sealed battery unit so the battery cannot be removed.

- Studies have shown that some children may not awaken from the sound of a smoke alarm for a variety of reasons. Parents and care providers should conduct a fire drill when their children are sleeping so they can assess their children's ability to awaken and respond appropriately. If children, or any other family members, do not awaken or do not react appropriately to the smoke alarm, the home escape plan should be modified accordingly to ensure that all family members are able to get out safely. The IAFC is aware of certain types of alarms that project a recording of the parents' voice or some other sound to which children may be more responsive than the traditional alarm.

- For elderly people, those who have impaired hearing or those who have other disabilities that make the alarm difficult to hear, there are smoke alarms that use strobe lights and vibrators in addition to sound. Exploring alternative approaches such as these may make sense in those households.

- Consider the installation of a residential fire sprinkler system. Fire protection involves a complex, multi-faceted approach that does not rely upon any one measure for safety.

- The National Fire Protection Association (NFPA) reports that the provision of both smoke alarms and residential fire sprinklers increases survivability of a fire in a home by 82% over having neither.

- Develop and regularly rehearse an escape plan with all members of your household, so that when the smoke alarm sounds, everyone will move to a safe location outside the home. For information on how to develop a home escape plan, see http://www.nfpa.org/assets/files/PDF/FPWgrid03.pdf.

The IAFC and the FLSS is grateful to Underwriters Laboratories, The NFPA Fire Protection Research Foundation, NFPA, and the National Association of State Fire Marshals for their contributions to this document, and hopes that the membership of the IAFC find this information useful when offering advice about smoke alarms to the public we so proudly serve.

Approved by IAFC Board, August 21, 2007

What You Should Know About

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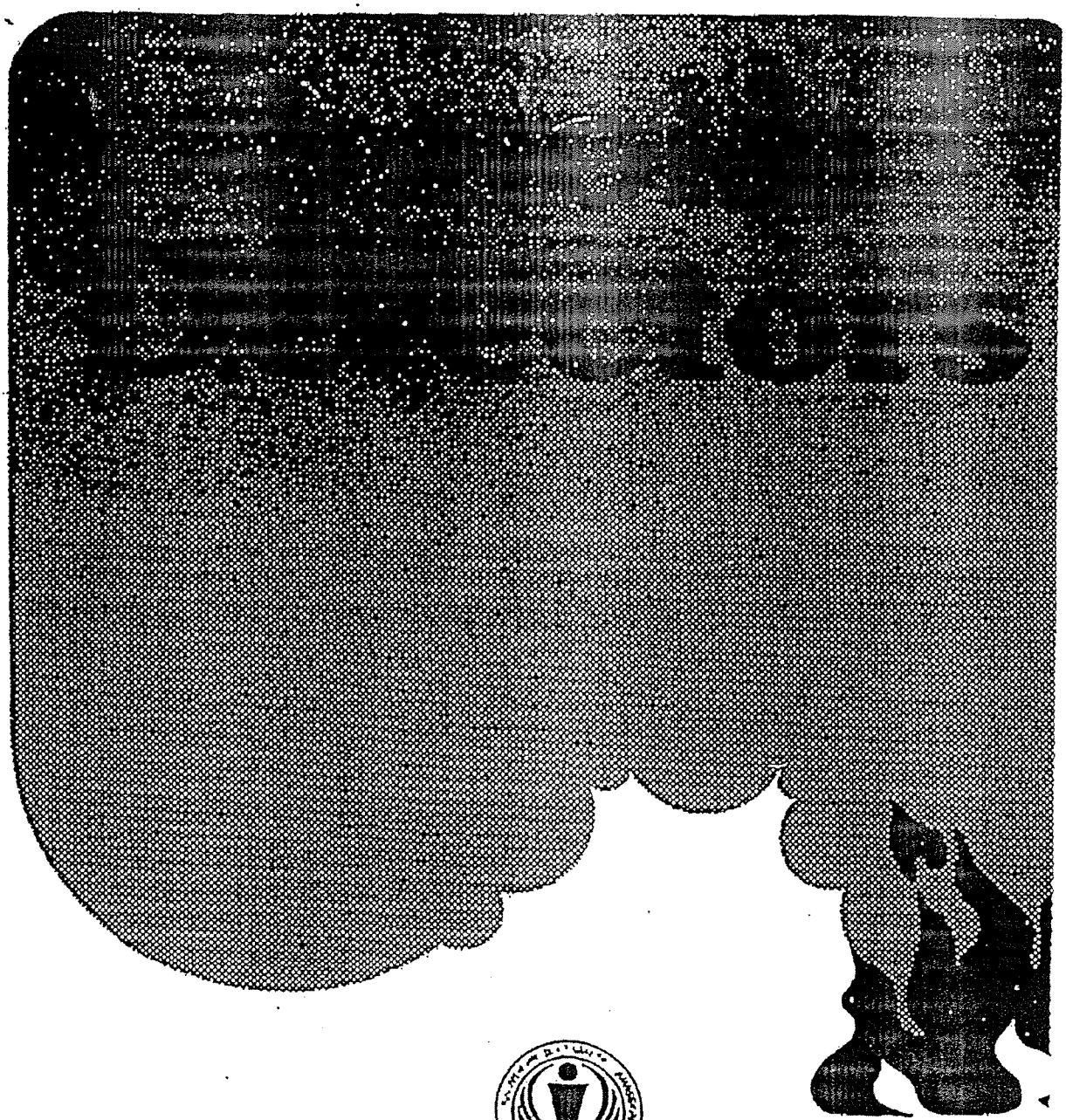

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